SOLDIERS OF PEACE FIND TASK UNFINISHED AFTER 100 YEARS

United States Coast and Geodetic Survey Began Its Work a Century Ago, but There Are Still Vast Areas That Remain Unmapped

A CENTURY ago the United States Coast and Geodetic Survey began its many sided work, actual field operations having been started on August 6, 1816. In the course of a hundred years one might imagine that the survey would have fulfilled its mission and gathered complete and precise knowledge of the United States from the hydrographic, topographic and geodetic points of view. But the fact is quite the contrary, not because of lagging effort, but because of the vastness of the task, the complexity of some of the problems involved, and the changing nature of many of the conditions.

It was authoritatively stated recently that there are unsurveyed areas of vast extent on the Atlantic, Gulf and Pacific coasts of the United States and that probably 80 per cent. of the shore line of Alaska may be regarded as unsurveyed. As commerce and industrial activities spread it becomes of growing importance that a more intimate knowledge should be available for the safer navigation of the ship, the more economical expansion of the railroad and the efficient development of water power and irrigation projects. Besides, land values increase with the augmenting of the population and the proximity of multiplying communities, and property lines must be known with the greatest exactness. The divisional lines between States and counties must also be established beyond dispute.

The work required of the men of the Coast and Geodetic Survey is varied. It has been said of them that the work "may be to pack a mule train or to command a ship, to pitch a camp or outfit a vessel, to sound along the edges of resistless breakers, to climb glaciers or to break through tropical jungles, to guide vessels through uncharted dangers or men along a mountain trail, to look after the health of the men in all climates, to provide months in advance for supplying food in regions where none can be purchased, to build structures which shall tower over tall trees of the Western forests in order to see distant stations, to observe the stars by night, to watch the swinging pendulum for the determination of gravity, to measure the forces of the earth's magnetism, to note the tides and currents, to sound the waters of the ocean, to map the topography of the land, to trace international or State boundaries or to cover the land with a network of triangulation or to join with the no less zealous coworkers in the office in the reduction and the discussion of results."

The Plattsburg recruits, even when burdened with their full marching kit, travel light by comparison with the men of the survey in the field, despite the aid of the motor truck and even the motorcycle. At times, it is necessary to pack the instrumental outfit on the backs of the men and with these loads to climb to the summits of towering mountains. Notwithstanding every effort to gain in lightness, the average weight of the packs is often seventy-five pounds per man.

There have been times when the men have toiled scores of miles through a rugged country devoid of trails, and the way has been so rough and precipitous that a half mile gain meant a whole day's toil. The members of the party not infrequently are obliged to carry their own blankets, provisions and water, and in some of the barren uplands they have had to transport their fuel.

The surveys in Alaska have been especially hazardous. In the mountain region through which the international boundary has been run the surveyors have had to negotiate deep crevasses, some of them more than 200 feet in depth and from 20 to 50 feet in width. Lives have thus been lost among the pioneers of topographical precision. Even with a crevasse with a gap of but 8 feet it takes a deal of courage to launch oneself in a leap across. A slip at the takeoff might easily mean death, and yet this very thing has been done time and time again in order that the line might be carried forward. The Arctic storm in the mountain tops brings its hazards too, and the annals of the survey's work in Alaska are full of privations cheerfully faced in bitter weather and amid the blinding sweep of driving snow. For days the men have been snowbound and often short of food.

Summer time in Alaska brings days of from sixteen to twenty-two hours of sunlight, and the limit to the hours of labor is that set by the physical endurance of the men. While their fellows in the mountains may be shivering in a blizzard, those along the coast are exposed to a blistering glare, and other things that make their tasks trying. As one of the field officers has described it:

"Some of the shore work in connection with this survey was exceedingly difficult. The head of Knik Arm, Cook Inlet, was one vast mud flat, so that it was not feasible, because of the loss of time involved, to use boats for transportation in executing the triangulation and topography. The larger part of this work, therefore, had to be done on foot, working from a centrally located camp.

"The officers and men engaged in this work were compelled to make long marches through mud, marsh or undergrowth, tormented by myriads of mosquitoes, and worked at any hour of the day or night when the tide served. In topography, particularly, where it was impracticable to drive them away by means of smudges, the mosquitoes proved such a torment that the use of the plane table was abandoned and the shore line was run in with the sextant."

The transportation problem is one that taxes every available means short of aircraft, and in many instances the surveyor's progress is slowed up because he has to cut trails, build roads and dig steps in the ice and rocks to effect a passage. It is no uncommon thing to build rafts of one sort or another, to cross a stream or to journey hundreds of miles down waterways flanked by towering mountains or well nigh impenetrable forests. The maintenance of supplies is of vital importance, and as much care is sometimes needed in preparing for an expedition as is demanded in advancing a fighting column. The enemy in the surveyor's case is nature, who interposes all sorts of hardships and hazards and shows an unfriendly spirit in many ways.

In triangulation work, where the country is covered by a network of imaginary lines, a reconnaissance is a matter of great complexity and demands much skill, long experience and rare judgment. The work is especially troublesome in heavily wooded country, because observations can be made over a considerable distance only by reaching points above the average plane of the tree tops.

This condition was emphasized during the survey's activities in making the secondary triangulation extending from the Strait of Juan de Fuca to Grays Harbor, Wash. The length of the arc was a matter of 110 miles, and there were sixteen stations in the main scheme, but despite the comparatively moderate length of the line, it is said that no piece of work done on land under the survey has required more resourcefulness and skill and imposed more trying hardships. The language of the official report, while temperate, suffices to stimulate the imagination of the layman.

"In much of the area traversed there were no trails and the heavy growth of timber and brush made progress almost as difficult as it is in a tropical jungle. Owing to the character of the country, it was impracticable to clear lines through the timber between stations. It was therefore necessary to elevate the instrument and the heliotropes and lamps above the timber.

"The lumber used for this purpose was cut in the forest in the vicinity of the stations, and in many cases trees were pulled together to make such supports. A number of the instrument stands were more than 100 feet high. One of them, that at station La Push, was 187 feet above the ground.

"In one case a tree used to support the lamp and heliotrope was sawed off at a height of 213 feet above the ground. The tower in this case was a single tree, cleared of limbs. It is easily seen that the occupation of these stations at night required steady nerves and great daring.

"The method used in climbing these trees was to drive in 14 inch spikes similar to those used on telegraph poles, one above the other about eighteen inches apart. In driving these spikes, a man standing on one spike, hooks his safety belt over the next one above and drives the third at about the height of his head."

It is one of the survey's principal tasks to establish points of height precisely so that altitudes or levels over wide areas can be measured. This is a matter of much concern where water power and irrigation projects are under advisement and also where a railroad company contemplates the building of either spur or main lines. The survey has by no means completed the so-called level net of the United States, but the work already done is astonishingly accurate when the difficulties encountered are taken into consideration. For instance, the levelling completed since 1899 allows a maximum discrepancy between two measurements on any section a mile long of only one-fifth of an inch.

In the field of oceanography, the survey has to map out coasts, measure the depths of the ocean and indicate the currents and the times of change from ebb to flow of the tidal waters. It also constructs the charts that show the navigator the paths he must follow, the dangers to be avoided and the character of the sea bed. Strange as it may seem, there is much about the navigable waters of the United States yet to be learned. This is due to the ceaseless changing of shifting sands and silt and the presence of rocks that have escaped detection in the past.

Therefore, although the Coast and Geodetic Survey is a hundred years old in service there is much right here at home to engage its attention and to call for even a bigger force. In addition there are the colonial possessions of the United States, and there too the survey is active in doing kindred work and will of necessity be so engaged for years to come. The survey is the oldest bureau of applied science under the Government.

"Back packing" up a mountain.

Checked by an ice gorge.

Surveyor at work near Arctic Ocean.

A mile long trolley used to gauge a river's flow.

No Man Since Lincoln Has Had So Many Stories Told of Him

James J. Hill's Picturesque Personality Will Live Long in Tales That Mirror the Man

IT has been said that no man since Abraham Lincoln has had so many stories told about him as the late James J. Hill. The Northwest teems with them—stories of his indomitable energy, his untiring industry, his odd, blunt mannerisms, and yet all without the malice which would characterize a man hated or feared.

Hill stories in the Northwest are used in public schools and in homes as examples for youths. He had come from a lowly little home himself, he had worked his way up to a position where he might be regarded as an institution rather than an individual. No matter how the bushy bearded old man might storm over his road he was always "Yim Hill" to the Scandinavians who worked for him or whose country had been created by his railroad. He was always "Jim Hill" to other tongues, whether city or country. It is likely that he will always be Jim Hill to the Northwest.

Out of the hosts of stories told and retold there is always that one of an Englishman's visit to this country. He was accustomed to the ceremony of British business and when he entered the office of the old man he divested himself of his overcoat, hat, goloshes and umbrella with great deliberation.

"Rawther a nice day, Mr. Hill," he began pleasantly.

"To h—l with the weather! What do you want?" came the surprising answer.

He never got over his habit of beginning work early in the day. He was always the first man down in his active days. A young employee arrived at 7:30 o'clock one morning, thinking to make an impression.

"Where have you been spending the day?" was the greeting he received.

One of his aversions was a locked desk in his office. He ordained that men who worked for him had no right to bring their secrets to his office. One morning at his New York office he had occasion to look for some report in the desk of an officer of his company and found it locked. When the officer in question arrived later he found the top of his desk kicked off and a sign sticking up in the wreckage, calling the attention of the force to the rule about locks. That desk remained on exhibition as a mute illustration.

Once a young stenographer showed promise and was promoted rapidly until he was a head of a department. He remained in that position for one week, when he was summarily discharged. "Why not put him back in his old job of assistant, where he made good?" asked some one.

"Don't want any failures around," was the reply.

He watched his railroad with microscopic care. Woe to the section hand who allowed anything to lie around his right of way or to the station master who showed carelessness about a station. "Jim Hill" would see it. Once, it is told, Mr. Hill, making one of his close inspections, found a perfectly good railroad spike lying by the side of the track. He looked up the section boss with fire in his eye and showed him the spike. The section man, however, had a quick brain. Before the storm could break he exclaimed:

"My goodness, Mr. Hill, I'm glad you found that spike! I've been looking for it for nearly three weeks."

They say he got by without the blowing up; even the old man had to smile.

To every Scandinavian, Norwegian or Swede Mr. Hill was a superman. The old railroad man was a backer of the late Governor Johnson, who carried the Republican State of Minnesota with ease. Some one asked a Swede farmer why he was voting for a Democrat.

"Yim Hill, he like him," was the only argument, and that was enough.

Once in a while Mr. Hill did not mind talking to newspaper men for publication when he had something to say. Upon his return from a trip abroad several years ago he gave an interview about general conditions in Europe and in this country which was more or less criticised. The reporter who obtained the interview went to see him a few days later:

"Seems to be I'm getting to talk too damned much," said the old man.

He was intensely interested in the loan to England and France negotiated last winter. He had one fixed principle in that and it was to see that some of the money went to the Western wheat men. His St. Paul statement, setting forth the financial benefit to the farmer of this country of such a loan, was afterward praised by Baron Reading as one of the things that swung the country in favor of the transaction.

A characteristic story of Mr. Hill relates to his newspaper experience. He awakened one morning in 1892 to find himself the owner of two St. Paul newspapers. Both were valuable plants. "I don't need two newspapers," said the railroad man, and forthwith he closed one down. He never attempted to sell it or dispose of it in any way. One of the editors had provided himself with a long term contract. Mr. Hill assumed that without blinking and carried it out until its expiration.

One very famous railroad man of the country acquired intimate first hand knowledge of Mr. Hill. This man came from the East and was regarded even in his younger days as a first rate railroad man. Unfortunately, no one had informed him sufficiently of the characteristics of the man for whom he was working. Mr. Hill expressed himself somewhat forcibly to this newcomer over some question of road management and the young official put up an argument. The empire builder was nonplussed for an instant, but he recovered and hit the Eastern railroad man square in the nose. That ended the argument for that time and thereafter.

Mr. Hill was fond of flowers and his conservatories at the foot of the bluff on Summit avenue contained some wonderful plants. The way from the mansion to the greenhouses was rather trying, so without hesitation Mr. Hill had a tunnel constructed from his home to the conservatories. It cost a great deal of money, but it saved time.

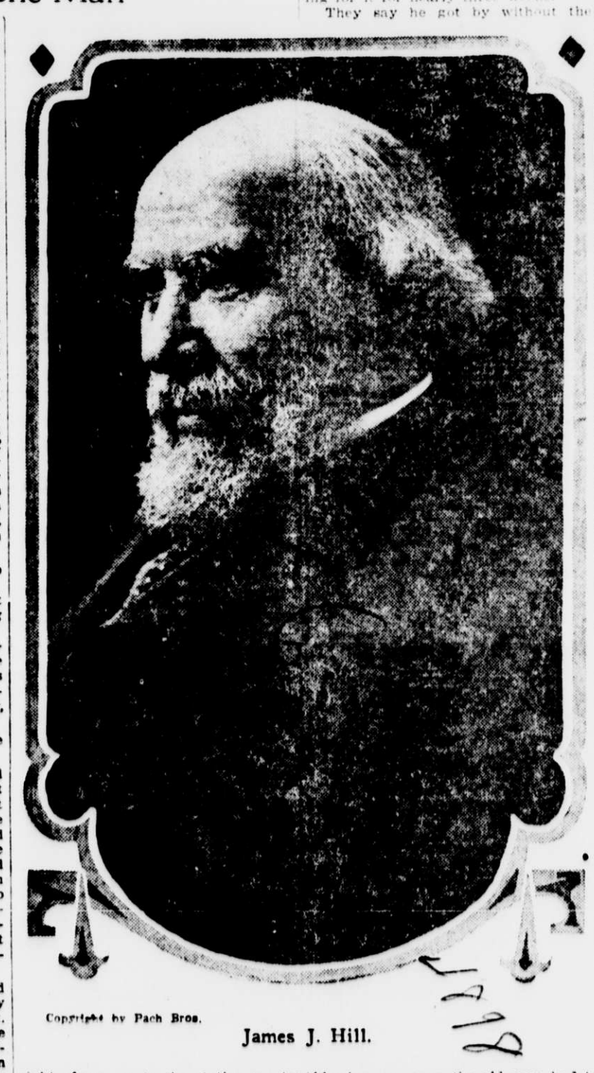
Mr. Hill was ever an advocate of scientific farming, and his experimental farms were to be found in every State through which the Great Northern ran. Any place he went his talk was always on increasing the production of wheat per acre. They say that two Minnesota farmers came upon a third working his head off fixing up his farm.

"Jim Hill must be coming," said one of them.

Strong financial interests laughed when he took the road that built up his country; that is, not all of them, but some. He came on to New York about that time because he needed some money and saw some bankers. One of them expressed the opinion that it was rather risky to build a road and wait for the country to grow up.

"It's going through just that way," was the answer, "whether you like it or not. The only thing that can stop me is my board of directors, and they can only stop until the next stock holders' meeting. The road is going through."

That summed up the whole man.



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James J. Hill.

FIRST AID DOGS FOR ARMY.

IT is a matter of general knowledge that dogs are being used to locate wounded soldiers who happen to fall in out of the way places by all the warring countries in the European conflict. Recently it became known that the United States War Department is arranging to buy and train dogs to be used for the same purpose.

The excellent work of the dogs in Europe only came to the notice of the army officials lately. In France the use of Belgian sheep dogs in seeking out the injured soldiers who were unable to walk or crawl to an open space where they could be discovered has resulted, according to army reports, in saving the lives of more than 2,000 men who might otherwise have died before they were found.

The dogs are trained not to bark when they find a disabled soldier. They are taught to disregard dead soldiers. Each dog has a box containing first aid medicines and appliance tied to its neck. Upon locating a helpless soldier the dog goes up close to him so that the box may be opened. The animal tears a piece of the uniform from the soldier and then returns to the kennel to which it is attached.

The better trained dogs return to the kennel, bark and turn back in the direction from which they came to indicate that they have found an injured soldier. A corps of surgeons are attached to the kennels and they follow the dogs to the injured men. Many times soldiers are found at the bottom of deep ravines and in other sequestered places where only dogs with a keen sense of smell could locate them. Sometimes it takes a whole day to get one soldier back to the base after he has been found because of the hazardous work of carrying him to a road.

Behind the German lines the dogs are similarly trained to go to the aid of the injured. And the same is done in Russia. England has trained airedales to hunt wounded soldiers. France has trained 2,000 sheep dogs for Red Cross work. Germany has many more. The Germans also use the larger dogs to haul light machine guns.

The Italian army has trained dogs to carry light munitions over conspicuous passes in the mountains where men would be subject to fire from the Austrians.

PLAN CHEAP POWER FOR WASHINGTON

AT the Great Falls of the Potomac, sixteen miles above Washington, stands the dilapidated ruin of what was once a mill. It is regarded by tourists as an object of much interest, and not without reason, inasmuch as it was built originally by George Washington to employ the water power for grinding corn.

Washington himself was a strong advocate of a project for constructing a dam and supplying the national capital with water power from Great Falls. Ever since then the idea has hung fire. The people of Washington are now trying to get an appropriation of $3,000,000 from Congress with which to start the work.

If undertaken by the Federal Government the engineers of the army will have charge of it. The job in that case falls within the purview of the Secretary of War, and the prospect of obtaining the requisite money from Congress depends first of all upon his favorable recommendation to that legislative body. The business men of the city through the Washington Chamber of Commerce have appealed to him on the subject and he has declared himself favorable to it, but he questions the expediency of starting the undertaking just at present lest the Treasury be embarrassed.

The people of Washington, however, are not willing that the project should be further postponed. Acting in their interest, the Chamber of Commerce is now urging the local government to assume responsibility for the undertaking, in which event the project would be carried out under the direction of the Engineer Commissioner of the District of Columbia, who is an army officer.

The advocates of the project assert that the present situation is in a way rather absurd. With enormous water power near at hand and readily available for use the city is wholly dependent for its supply of electricity upon the burning of coal. The Government produces by this means nearly all of the electricity it uses locally for lighting the public buildings, but citizens are obliged to buy electricity from a corporation, which charges them for it at the rate of 10 cents a kilowatt hour.

Engineers have estimated that the Great Falls plant, once established, could produce electricity at a cost of less than one-third of a cent per kilowatt hour. This would save the Government a lot of money; for it now pays two cents and a fraction. Interest on the money invested, with sinking fund charges, would run the cost up to five-sixths of a cent, but a price of two cents to the citizen consumer would, even at this rate, yield a large profit.

Naturally the citizens would be glad to see their bills for electricity cut down to one-fifth of their present size. It might be supposed that the street car lines, all of which are run by this kind of power, would likewise welcome the suggested change. But here is a curious paradox: they do not want it and all the influence they possess is exerted against the Great Falls project. The reason why is very simple; under present circumstances they get all the electricity they use for nothing.

This fact has only recently come out. Between the street car ownership and the corporation that makes and sells electricity there is a close relation. For years past the electric concern, acting under a "gentlemen's agreement," has made a free gift to the street car company of all the current required by the latter. Indeed, the street car company gets so much of it gratis that it has a surplus left over, which it sells on its own account for something like $35,000 a year.

Of course, all of this has to come out of somebody's pocket. It is the private consumer of electricity who pays. The nickel he gives the conductor for carfare does not settle his bill for local transportation; he must make an additional contribution, through the electric power company, for running the cars. It costs a lot of money to run the street cars of Washington. No wonder, then, that the price of electricity is high.

It is reckoned that the total cost of the great Falls project will be a little over $15,000,000. One suggestion made is that Congress shall give half the money and the District the balance. Another is that the Federal Government shall construct the plant and bring the electricity twelve miles, to the District boundary line, the District government then assuming responsibility for the distribution of current.

The estimated horse-power available at the falls is from 15,400 to 99,500, according to the stage of the river. Washington's present requirement is 11,000 kilowatts, representing 14,751 horse-power. By 1937, it is thought, the demand will have risen to 34,866 horse-power, delivered in the city. Inasmuch as the loss of power in transmission over the wires will be something like 20 per cent., it is obvious that at periods in dry years the supply of electricity from Great Falls will have to be supplemented by steam plants.

The Government owns several such plants, the most important of which, and one of the best equipped in the world, is used to light the Capitol, the office buildings of Senate and House and the Library of Congress. It has a capacity of over 10,000 horsepower. When the water power at Great Falls is developed not only these buildings but also those of the Federal departments could get their electricity from that source at a much diminished cost.

It is proposed to construct a high dam a short distance above the old Chain Bridge and just inside the District boundary line for storing the surplus water when there is plenty of it. By this means an artificial lake with a surface area of 3,000 acres will be formed, its contents to be utilized at dry periods to maintain the power output. The lake is expected to be a scenic attraction and an ornament to the capital's neighborhood. Incidentally, it will serve as a settling basin for the city's water supply purifying the latter.

To make this last point clear it should be explained that the Great Falls project is designed not only as a water power development for the production of electricity but also to augment the water supply of Washington. It is expected that within eight years from this time the present water supply of the city will have become insufficient. Means must be taken to increase it, and advocates of the project urge that it is not now too early to start the work.

The water supply is to be increased by pumping water from the artificial lake to the Dalecarlia reservoir. This part of the project, it is estimated, will cost $5,172,600. For the power development pure and simple the estimate is only $9,819,000.

The proposed lake will overflow a short stretch of the Chesapeake and Ohio Canal, a section of electric railroad and a small length of the Baltimore and Ohio tracks, involving some relaying of the latter, the reconstruction of a piece of the canal and the payment of a moderate sum for damages. Already this artificial body of water has been called Lake Washington, though as yet it does not exist; but the likelihood seems to be that eventually it will be named Lake Meigs, in honor of Lieut. M. C. Meigs, an army engineer, who provided the city with the water supply which only now, after a lapse of sixty years, requires enlargement.

It is thought that cheap electric power would be likely to attract many small factories to Washington, where at the present time there are only a few. The establishment of big manufacturing establishments is systematically discouraged by the local authorities, a fact which undoubtedly has much to do with the conspicuous desirableness of the capital as a place of residence.